



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/707,942	01/27/2004	Haoxing Ren	FIS920030335US1	1941
32074	7590	09/21/2005	EXAMINER	
INTERNATIONAL BUSINESS MACHINES CORPORATION DEPT. 18G BLDG. 300-482 2070 ROUTE 52 HOPEWELL JUNCTION, NY 12533			WHITMORE, STACY	
			ART UNIT	PAPER NUMBER
			2825	

DATE MAILED: 09/21/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/707,942

Applicant(s)

REN ET AL.

Examiner

Stacy A. Whitmore

Art Unit

2825

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 27 January 2004.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 13 and 14 is/are allowed.
- 6) ☒ Claim(s) 1, 2, 5-7, 10 and 15 is/are rejected.
- 7) ☒ Claim(s) 3, 4, 8, 9, 11 and 12 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 January 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>1/27/04</u> . | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Specification*

1. The abstract of the disclosure is objected to because the abstract should be on a single sheet and does not require the title to be on the abstract sheet. Correction is required. See MPEP § 608.01(b).

### Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-2, 5, 7, 10, and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by Cheng (US Patent 5,798,936).

3. As for claims 1-2, 5, 7, 10, and 15, Cheng discloses the invention as claimed, including a method (medium comprising instructions) for optimizing the placement of a plurality of cells on a VLSI chip comprising the steps of:

(note that for claim 15, the limitations in the preamble related to static timing analysis, and global sources of delay variation are not given patentable weight because the limitations are not part of the limitations in the body of the claim);

Subdividing the plurality of cells into partitions by performing a sequence of cuts [fig. 1, col. 3, lines 53-55];

Iteratively managing the sequence of cuts to perform a look ahead operation [col. 3, lines 55-58];

Returning to the cut from where the look ahead operation was initiated by comparing the original placement with the cut provided by the look ahead operation [fig. 1, elements 16-20, loop back the cuts; col. 3, lines 55-56] and

Altering the priority of the placement to ensure that the quality of the results achieved at the look ahead point is improved [col. 3, lines 51-58 – the priority of the placement is altered or reiterated in order to improve on the min-cut placement];

Performing a cost function analysis to quantify the quality of the placement [col. 3, line 64 – col. 4 – shows the cost analyses based on vertical and horizontal methods];

Optimizing the quality of the placement [col. 3, line 64, col. 5 – shows the quality of the placement is optimized through routing resources and congestion]; and

Generating placement directives to force the placement to move in a direction specified by the optimization [col. 5, lines 18-26];

Wherein multiple optimizations are part of a single placement flow wherein a single optimization has the same or different degrees of look ahead [col. 3, line 48 – col. 5 – multiple optimizations are the congestion, routing resource, and directional];

Wherein the optimization function identifies specific improvements that are required by the placement [col. 3, line 48 – col. 5 specific improvements identified are congestion, routing resources and direction];

Wherein the directives drive the placement process in a direction indicated by specific optimizations [col. 5, lines 18-35];

### Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.

Patentability shall not be negated by the manner in which the invention was made.

4. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Cheng (US Patent 5,798,936) in view of Dangelo (US Patent 6,324,678).

5. As for claim 6, Cheng discloses the invention substantially as claimed, including a method for optimizing the placement of a plurality of cells on a VLSI chip including a cost function with congestion see as cited in the rejection of claims 1-2, 5, 7, 10, and 15 above.

Cheng does not specifically disclose timing included in the cost function.

Dangelo discloses timing costs in a partitioning design [col. 35, line 41 – col. 36, line 9].

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Cheng and Dangelo because adding timing considerations to Cheng's cost function would have improved Chang's method by adding a parameter that would improve overall circuit performance by at least considering timing due to movement of placements in Cheng's design method [see Dangelo, col. 35, line 41 – col. 36, line 9].

6. Claims 3-4, 8-9, 11-12 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

7. Claims 13-14 are allowable over the prior art of record.

8. The following is a statement of reasons for the indication of allowable subject matter: The prior art of record fails to disclose the invention as claimed, either singularly

or in combination including at least [claims 3-4], the step of wherein the selection of look ahead points varies in accordance with the level of optimization required; [claims 8-9], wherein the optimization function for timing comprises logic restructuring, repowering, and buffer insertion; and [claims 13-14] steps b1-b3 of claims 13-14 in the context of all other limitations in the claims.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stacy A. Whitmore whose telephone number is (571) 272-1685. The examiner can normally be reached on Monday-Thursday, alternate Friday 6:30am - 4:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Smith can be reached on (571) 272-1907. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Stacy A Whitmore  
Primary Examiner  
Art Unit 2825

A handwritten signature in black ink, appearing to read 'SAW', is written over the printed name and title of the examiner.

SAW

September 19, 2005